

Temperature Probes



Try the probes. Get a feeling for how the software (Logger Lite) works.

Look through the experiment book that came with the probes. See what they have in mind.

Try a few experiments of your own. You have water, vinegar, baking soda, a couple of cups, and whatever else you can lay your hands on. Clean up when you are done, please.

Light Sensor

Try the sensor. Get a feeling for how the software works.

Point the sensor at the different colors on the screen and see how the readings differ. Try some of your own color choices if you like. How do the readings differ when you point the sensor at the similarly colored pieces of paper rather than the screen?

Point the sensor at a light source and then watch the reading as you bring the sensor steadily closer to and then farther from the light? (Try to move the sensor at the same rate throughout.) How does the reading vary?

Try a few experiments of your own. Please put things back as they were when you are ready to move to the next station.



Sound Level Meter

The meter measures sound levels in decibels.



Here are the general operating procedures:

1. Slide the red power switch to the appropriate range (35-90 for normally encountered sound levels and 75-130 for louder to very loud sounds – see table below).
2. Set the time weighting switch to "S."
3. Set the maximum level hold switch to "RESET."
4. Set the frequency weighting to "A."

The meter can be used as a stand-alone device in which case measurements are read from the LCD screen, or it can be connected to a computer or TI Graphing Calculator.

Your job is to imagine how you might get students to use the device to gather data that will allow them to ask and answer their own questions, using math as a way of making sense of their experiences.

Example Sound Levels

Source Sound Pressure Level (dBA)

Large Rocket (nearby)	180 to 194
Jet Aircraft	150
Shotgun Blast	145
Propeller Aircraft	140
Pneumatic Riveter, Threshold of Pain	130
Rock Concert, Thunder	120
Construction Noise	110
Subway Train	100
Heavy Truck	90
Noisy Restaurant	80
Busy Traffic, Normal Radio	70
Normal Conversation, Dishwasher	60
Quiet Office	50
Library	40
Soft Whisper	30
Rustling Leaves	20
Normal Breathing	10
Threshold of Hearing	0



Olympus Digital Voice Recorder DS-2

1. Turn it on by moving the HOLD button on the left side down. (Turn it off when you are done by moving the HOLD button up.)
2. Press the REC button to start a recording.
3. Press the STOP button to, well, STOP recording.
4. To DOWNLOAD a recording, first plug the cradle into your computer. Then plug the voice recorder into the cradle. Wait a moment until an icon representing the voice recorder appears on the desktop. It will probably be cleverly labeled, "Untitled." Next, double click on this icon. Go to the folder "DSS_FLDA" (FLDA represents "Folder A.") and open it up to find your file or files. In order to store them for later use, drag them somewhere, perhaps onto the desktop for experimentation, into your folder within the documents folder, into your flash drive, etc. Next, open DSS Player (whose icon should be in the dock.), an application meant to enable you to work with the sound files. When this application is running, under File, you will find the command "Import File." Use this to select the sound file you just placed somewhere. Finally, under File, use the "Convert to AIFF file" command to make an AIFF file, which PowerPoint will like or at least tolerate. (Other programs, e.g., "EasyWMA," will allow you to convert the file to the mp3 format.) You can now use the AIFF file in programs like Word, PowerPoint, etc. You can also drag it into iTunes where it can be used in iMovie, etc.
5. To ERASE the files from the voice recorder, press the FF or REW button to choose the file you want to erase. Press the ERASE button on the right side of the recorder. ("Cancel" will flash.) Press the down arrow button on the right side of the recorder to choose START. ("START" will flash.) Finally, press "DISPLAY" button. This will erase that file. Repeat as necessary.

Global Positioning System (GPS)

~10 minutes Read /skim the article.

~ 20+ minutes Use the GPS unit to find your way to The Tree and back. Here's how:

- a.) if needed, turn the unit on (power) and wait until the satellites are "caught".
- b.) Push the "Page" button repeatedly until you get to the "Menu" page.
- c.) Use the "up" and "down" buttons to highlight the "Waypoints." Press "Enter." Find "GATE," highlight it, and press "Enter."
- d.) Use the "Go To" function to be guided, more or less, to the gate that heads out into the forest behind the school. (Remember that once you get within about 20 or 30 feet of the target, the readings can get pretty random....)
- e.) Repeat steps b -> d to go to the "TREE."
- f.) Repeat steps b -> d to go back to the "SUCLASS."

~ 10 minutes Consider and be ready to discuss possible educational uses for this thing.

NCTM Illuminations: Activities & Web Links

<http://illuminations.nctm.org/>

Go there and be like Lewis, Clark and Sacajawea. Explore in pairs or on your own. Be sure that, between the members of the group, you check into both “Activities,” and “Web Links.”

National Library of Virtual Manipulatives

<http://nlvm.usu.edu/en/nav/vlibrary.html>

This is a digital library containing Java applets and activities for K-12 mathematics. Just as with the NCTM Illuminations site, explore!



Go to <http://www.un.org/cyberschoolbus/>

Look in the upper left hand corner of the page under “Resources” to find “InfoNation.” If you are using a Mac, click where it says: “Mac users click here.” You may have to wait a moment ... or two. When you get there you will find a series of 3 steps.

STEPS 1 and 2: You can use step one (“Select a Country Grouping”) if you like. I often skip it. In step 2 you “Select Individual Countries.” You can get information on up to 6 individual countries using the dropdown menus to select your countries. After you have selected your countries, click on the red GO button and then wait... Soon, or at least relatively soon, the page will refresh with your country selections entered on the graphs waiting in step 3.

STEP 3: Use the dropdown menus above the graphs to select first a category and then a statistic. The data, if it is available, will be displayed in the form of a bar chart. If you want to know more about the statistic you have selected, how it is defined, etc., you can click on the statistic name which appears above the chart on the left side.

There are dozens of interesting statistics. For example, you can select Afghanistan, Iraq, the United States, North Korea (Democratic People's Republic of Korea) and Australia, then look at CO2 emissions per capita and then compare that to Educational Expenditure or GDP per capita or Refugees,... for example.



<http://zipskinny.com/>

This site gives you a VERY interesting route into the Census 2000 data obtained from the [Census website](#). Briefly, the idea is that you enter a zip code, hit Return and get a feast of numbers, statistics, and graphical comparisons that represent the demographics of that zip code. This is interesting as you learn how your neighborhood stacks up against others. More importantly it could be a useful tool for enabling students to ask their own such questions and begin to wonder about segregation, how resources are distributed and so forth. Try comparing your zip code to 98039....



<http://earth.google.com/>



Like Earth Browser (<http://www.earthbrowser.com/>) this Web-based program has the potential to provide a tremendous amount of numerical data. Further, it is an excellent vehicle for student choice, enabling them to ask their own questions and seek their own answers using math as a way to make sense. The program must be downloaded (free) and installed.

The Center for Innovation in Engineering and Science Education

<http://www.k12science.org/currichome.html>

In their own words: “CIESE sponsors and designs interdisciplinary projects that teachers throughout the world can use to enhance their curriculum through compelling use of the Internet. We focus on projects that utilize real time data available from the Internet, and collaborative projects that utilize the Internet's potential to reach peers and experts around the world.”

Be sure to check out both “Collaborative Projects” and “Real Time Data Projects.”



**Collaborative
Projects**



**Real Time
Data Projects**



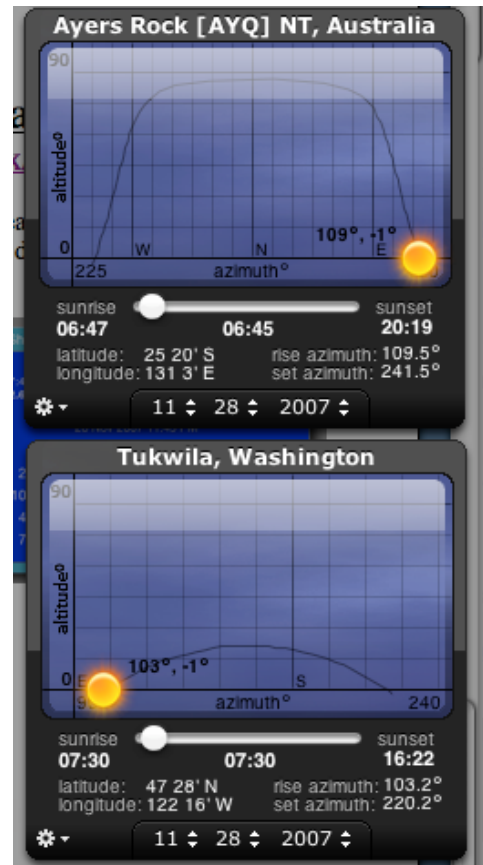
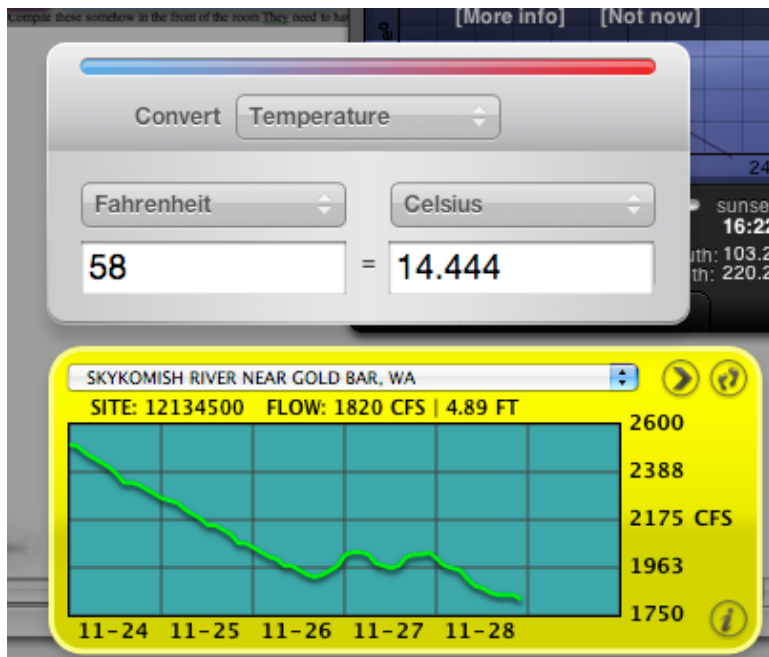
<http://www.funbrain.com/kidscenter.html>

Go the “numbers” section and try some of the games provided there. Be sure to try “Math Baseball,” “Fresh Baked Fractions,” and “Guess the Number Plus.” Think about the different sorts of purposes that are served by these games. How would you use this site as a teacher?

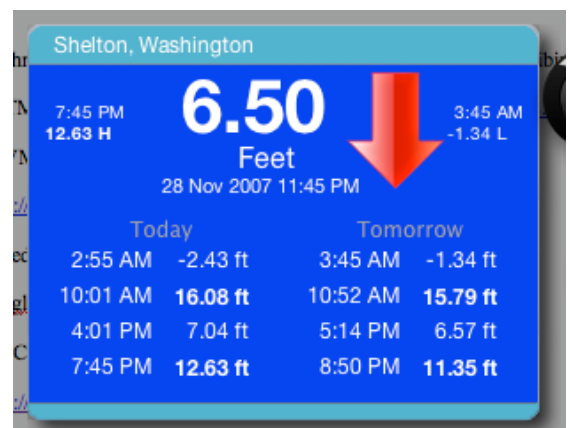
Dashboard Widgets (Apple) Math and Science

http://www.apple.com/downloads/macosx/math_science/

It's a little hard to describe what a widget is but it's easy to see their utility as a way to give access on demand to any number of data streams. Here are some of the widgets I have on my computer:



Go to the Web site and explore the offerings with a mind to how these data sources might enable you to get students more involved.



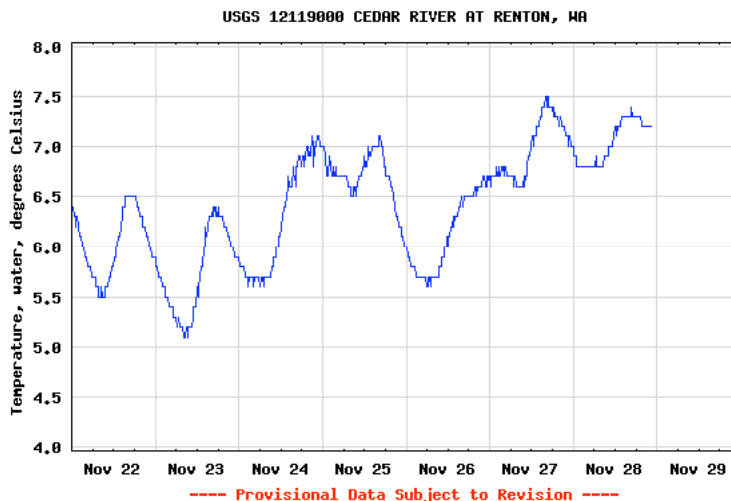
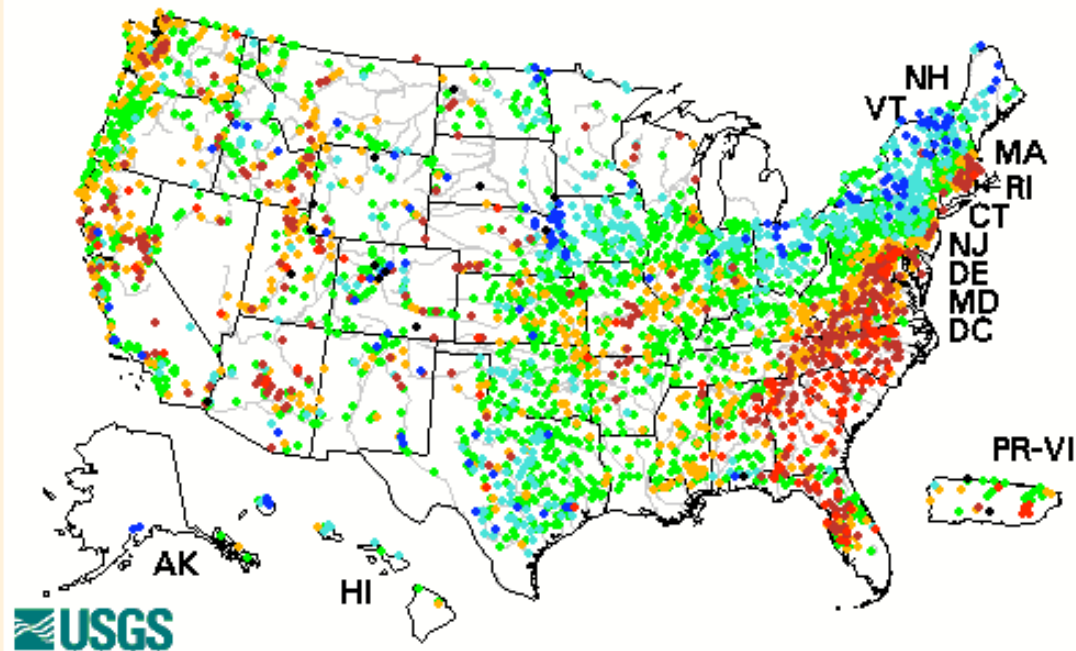
USGS Real Time Water Data

<http://waterdata.usgs.gov/nwis/rt>

All of the dots on the map represent stream recording stations where data are collected sent in and made available in real time through the Web. Click on a state to get a closer view of what's going on in all of the stream sites in our state and in your watershed.

Daily Streamflow Conditions

Thursday, November 29, 2007 02:30ET



Here are some temperature data from the Cedar River.





National Weather Service observations for the past three days

<http://www.weather.gov/view/national.php?map=on>

Go to the site, click on a state and then on a town shown in the state. This will yield a page of data representing weather conditions observed over the past three days. Hundreds of cities are available all over the US.

Variables include: Wind Speed, Visibility, Sky Condition, Air Temperature, Dewpoint Temperature, Pressure, Precipitation, and more!

Ephrata Municipal

Enter Your "City, ST" or zip code

Go

en español

Date	Time (pst)	Wind (mph)	Vis. (mi.)	Weather	Sky Cond.	Temperature (°F)				Pressure		Precipitation (in.)		
						Air	Dwpt	6 hour		altimeter (in.)	sea level (mb)	1 hr	3 hr	6 hr
								Max.	Min.					
28	23:53	N 8	1.50	Light Snow Fog/Mist	OVC006	31	30			30.08	1020.0	0.02		
28	22:53	N 7	1.50	Light Snow Fog/Mist	OVC006	31	30			30.09	1020.2	0.02		
28	21:53	N 8	1.75	Light Snow Fog/Mist	OVC004	31	30	32	31	30.09	1020.6	0.01		0.03
28	20:53	N 9	3.00	Light Snow Fog/Mist	OVC004	31	29			30.11	1021.0			
28	19:53	N 9	2.50	Light Snow Fog/Mist	OVC006	31	29			30.13	1021.9	0.01		
28	18:53	N 8	1.75	Light Snow Fog/Mist	OVC015	31	29			30.16	1022.9	0.01	0.01	

US Census Bureau – Fact Finder

<http://factfinder.census.gov/> or


Quick Facts

<http://quickfacts.census.gov/qfd/>

Both of these sites provide access to census data and enable interesting investigations in which students can use mathematics to inquire and build understanding of things they care about.

For the **Fact Finder**, you can start by entering your home town zip code in the box and then comparing these data to those that come from another zip code, say, 90210.

Fast Access to Information



Get a **Fact Sheet** for your community...

city/ town, county, or zip

state **GO**

[or select a state using a map »](#)

The **Quick Facts** site, enables comparisons of cities, counties, states etc.

Washington counties - [selection map](#) Washington cities - [place search](#) [More Washington data](#)

Select a county Go Select a city Go

Washington

[Further information](#) Want more? [Browse data sets for Washington](#)

People QuickFacts	Washington	USA
Population, 2006 estimate	6,395,798	299,398,484
Population, percent change, April 1, 2000 to July 1, 2006	8.5%	6.4%
Population, 2000	5,894,121	281,421,906
Persons under 5 years old, percent, 2005	6.3%	6.8%
Persons under 18 years old, percent, 2005	23.6%	24.8%
Persons 65 years old and over, percent, 2005	11.5%	12.4%
Female persons, percent, 2005	50.1%	50.7%
White persons, percent, 2005 (a)	85.0%	80.2%
Black persons, percent, 2005 (a)	3.5%	12.8%
American Indian and Alaska Native persons, percent, 2005 (a)	1.7%	1.0%
Asian persons, percent, 2005 (a)	6.4%	4.3%
Native Hawaiian and Other Pacific Islander, percent, 2005 (a)	0.5%	0.2%
Persons reporting two or more races, percent, 2005	3.0%	1.5%
Persons of Hispanic or Latino origin, percent, 2005 (b)	8.8%	14.4%
White persons not Hispanic, percent, 2005	77.1%	66.9%
Living in same house in 1995 and 2000, pct 5 yrs old & over	48.6%	54.1%
Foreign born persons, percent, 2000	10.4%	11.1%
Language other than English spoken at home, pct age 5+, 2000	14.0%	17.9%



<http://www.numbernut.com/>

Practice, practice, practice. This site provides MANY opportunities for students to practice basic (and some advanced k-8) skills.

Basic Math Topics include: Shapes & Colors, Numbers, +, -, X, ÷, Dates and Time, and Operations.

Advanced Math Topics include: - Fractions, Decimals, Percentages, Estimation & Rounding, Ratios, and Money Math

On the opening page, you will see a bunch of math symbols. These represent the topics you can work on. Click one of these and you will get a chance to read a little bit about some aspect of the topic. Below that you will find links to Activities. Try these and consider the implications for practice and the automation of skills.



INTERNATIONAL CHILDREN'S DIGITAL LIBRARY

<http://www.icdlbooks.org/>

This is a great place to get virtual access to MANY international children's books.

For a start you can click the link, "Read Books" under the heading, "THE LIBRARY" in the upper left of the page. This will take you to the "Simple Search" page where you search for books by the general content, by the age range, by the length, or by the color of the cover (?). You can also sort by language. When you find one you want you can click on it to get some summary information, then click again to get thumbnail pictures of all the pages. Click on one of these to get started. Click on each page to advance through the book.